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DEPARTMENT OF THE TREASURY
BUREAU OF ENGRAVING AND PRINTING
WASHINGTON, D.C 20228-0001
BEP SPECIFICATION
FOR
PAPER: DISTINCTIVE CURRENCY

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification establishes performance and acceptance requirements for distinctive currency paper. The material shall be suitable for use in the Bureau of Engraving and Printing, hereinafter referred to as the "BEP".

1.2 Classification. This specification covers four types of currency paper in sheet form which incorporate different types of security features. **Table I** lists the BEP stock item numbers for the currency paper.

1.2.1 Type I Distinctive Currency Paper. Type I currency paper contains distinctive red and blue security fibers. It shall be suitable for use in printing United States currency on sheet-fed intaglio printing presses and processing equipment that utilizes typographic printing. This material shall be assigned BEP stock item number **1D000039**.

1.2.2 Type II Distinctive Currency Paper. Type II currency paper contains distinctive red and blue security fibers and embedded non-fluorescent security threads. It shall be suitable for use in printing United States currency on sheet-fed intaglio printing presses and processing equipment that utilizes typographic printing. Type II currency paper shall be assigned BEP stock item numbers **1D390005** and **1D390010** depending on the denomination to be printed.

1.2.3 Type III Distinctive Currency Paper. Type III currency paper contains Advanced Counterfeit Deterrence (ACD) distinctive red, blue, and clear security fibers; embedded fluorescent security threads; denomination-specific watermarks; and possibly other security features mutually agreed upon between the contractor and the BEP. Type III paper shall be suitable for use in printing United States currency on sheet-fed intaglio printing presses and processing equipment that utilizes typographic printing. This material shall be assigned BEP stock item numbers **1D39A020**, **1D39A050**, and **1D39A100**, depending on the denomination to be printed.

1.2.4 Type IV Distinctive Currency Paper. Type IV currency paper shall incorporate counterfeit deterrence features not determined at this time. The features should be resistant to counterfeiting, durable, recognizable, and useable by the general public. The paper shall be suitable for use in printing United States currency on sheet-fed intaglio printing presses and processing equipment that utilizes typographic printing. The BEP stock item number for this material shall be assigned once the security features are accepted.

TABLE I Distinctive Currency Paper Stock Item Numbers

Denomination	Currency Paper Type			
	I	II	III	IV
$ 1	1D000039	–	–	TBD (To Be Determined)
$ 2	–	–	–	TBD
$ 5	–	1D390005	–	TBD
$ 10	–	1D390010	–	TBD
$ 20	–	1D390020	1D39A020	–
$ 50	–	–	1D39A050	–
$ 100	–	–	1D39A100	–

1.3 Sample Lots. When denomination designs are revised for printing on Type III and IV papers, the BEP shall request that the contractor supply samples of the paper containing the security feature(s) selected. For example, if the selected design calls for a watermark, the BEP shall request the contractor to supply samples of watermarks conforming to the portrait artwork supplied by the BEP. Sample lots will be printed and processed on BEP equipment to evaluate the printability of the paper for regular production work.

2. APPLICABLE DOCUMENTS

The issues of the following documents are those in effect on the date of the request for proposals (RFP).

2.1 Government Documents.

2.1.1 Specifications, Standards, and Handbooks.

Bureau of Engraving and Printing Specifications:

I: ICWC-1 Inks: Cylinder-Wipe, Non-Heatset, Intaglio, Sheet-Fed Currency Inks and Varnish

I: CSI-1 Ink: Color Shifting, Cylinder-Wipe, Non-Heatset, Intaglio, Sheet-Fed Currency Inks

I: TCGB-1 Ink: Typographic, COPE Green and Black

L: VAB-1 Specification for Vendor Affixed Barcode Labels for the Bureau of Engraving and Printing Materials

(Request for copies should be addressed to the Contracting Officer, Bureau of Engraving and Printing, 14th and "C" Streets, S.W., Washington, D.C. 20228-0001.)

2.1.2 Other Government Documents, Drawings, and Publications.

The following other Government documents, drawings, and publications form a part of this document to the extent specified herein.

Bureau of Engraving and Printing Test Methods:

STM 300.001 Crumple Test

STM 300.002 Laundering Test

STM 300.003 Chemical Resistance Tests

STM 330.004 Bonding Strength Determination by Elongation of Security Thread in Currency Paper

Bureau of Engraving and Printing Drawing:

MC-5102-B1, revision 2 Details of Skidload for 32-Subject Size Distinctive Currency Paper

Bureau of Engraving and Printing Schematic Drawings:

Security Features: Figures 1, 2, and 3

(Request for copies should be addressed to the Contracting Officer, Bureau of Engraving and Printing, 14th and "C" Streets, S.W., Washington, D.C. 20228-0001).

Title 18 United States Code, Section 474 of Public Law 772, 80th Congress

(Accessible at most public or law libraries.)

29 CFR 1910, Part 1200 -- Hazard Communication Standard (Occupational Safety and Health Administration) See also Federal Register Vol. 48, No. 228, November 25, 1983.

40 CFR 250 -- Environmental Protection Agency (EPA) Guideline for Federal Procurement of Paper and Paper Products Containing Recovered Materials. See also Federal Register Vol. 53, No. 23546, June 22, 1988.

40 CFR 720 -- Premanufacture Notification; Premanufacture Notice Requirements and Review Procedures.

(The Code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Reprints of certain regulations may be obtained from the Federal agency responsible for their issuance.)

California's "Safe Drinking Water and Toxic Enforcement Act" of 1986 (Proposition 65)

(Request for copies should be addressed to the State of California Health and Welfare Agency, 1600 Ninth Street, Room 450, Sacramento, California 95814.)

2.2 Non-Government Publications.

The following documents form a part of this document to the extent specified herein.

American National Standards Institute/American Society for Quality Control (ANSI/ASQC):

Q9002-1994 Quality Systems - Model for Quality Assurance in Production, Installation, and Servicing

(Request for copies should be addressed to the American Society for Quality Control, Attn: CSR Department, 611 East Milwaukee, P.O. Box 3005, Milwaukee, Wisconsin 53202-3005.)

American Society For Testing and Materials (ASTM) Methods:

D 2244 Calculation of Color Differences from Instrumentally Measured Color Coordinates

G 26 Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials

(Request for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.)

The Dictionary of Paper

(Request for copies should be addressed to the Technical Association of the Pulp and Paper Industry, Technology Park Atlanta, P.O. Box 105113, Atlanta, Georgia 30348-5113.)

National Motor Freight Classification Rules and Container Specifications

(Request for copies should be addressed to the American Trucking Association, Inc., 2200 Mill Street, Alexandria, Virginia 22314-4677.)

Testing Methods and Standard Practices of the Technical Association of the Pulp and Paper Industry (TAPPI)

T-211 Ash in Wood, Pulp, Paper and Paperboard: Combustion at 525°C
T-400 Sampling and Accepting a Single Lot of Paper, Paperboard, Containerboard, or Related Product
T-401 Fiber Analysis of Paper and Paperboard
T-402 Standard Conditioning and Testing Atmosphere for Paper, Board, Pulp Handsheets and Related Products
T-409 Machine Direction of Paper and Paperboard
T-410 Grammage of Paper and Paperboard (Weight Per Unit Area)
T-411 Thickness (Caliper) of Paperboard and Combined Board
T-414 Internal Tearing Resistance of Paper (Elmendorf Type Method)
T-423 Folding Endurance of Paper (Schopper Type Tester)
T-425 Opacity Of Paper 15°/Diffuse Illuminant A, 89% Reflectance Backing and Paper Backing)
T-435 Hydrogen Ion Concentration (pH) of Paper Extracts (Hot Extraction Method)
T-452 Brightness of Pulp, Paper, and Paperboard (Directional Reflectance at 457 nm)
T-456 Wet Tensile Breaking Strength of Paper and Paperboard
T-494 Tensile Breaking Properties of Paper and Paperboard (Using Constant Rate of Elongation Apparatus)
T-502 Equilibrium Relative Humidity of Paper and Paperboard

(Request for copies should be addressed to the Technical Association of the Pulp and Paper Industry, Technology Park Atlanta, P.O. Box 105113, Atlanta, Georgia 30348.)

Uniform Freight Classification Rules

(Request for copies should be addressed to the Uniform Classification Committee, 222 South Riverside Plaza, Chicago, Illinois 60606.)

2.3 Order of Precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.4 Internal References. All paragraph and table references will be to sections and tables of this specification, unless stated otherwise.

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3. REQUIREMENTS

3.1 Material.

3.1.1 Type I, II, and III Material. The paper shall be formed from cotton and linen only; with the linen content held at 25% ± 5%. No wood fiber shall be added to the furnish. If an internal size is required to meet the tensile strength (wet) requirement listed in **Table VI**, the internal size shall not contain melamine formaldehyde. The degree of surface sizing shall be sufficient to obtain acceptable print quality and ink adhesion as required in sections 3.5.3, 3.5.4.1 and 3.5.4.2.

3.1.2 Type IV Material. The paper may be formed from any materials as long as specification requirements are met. The paper shall possess the tensile strength (wet) listed in **Table VI.** If an internal size is required to meet the tensile strength (wet) requirement listed in **Table VI**, the internal size shall not contain melamine formaldehyde. The degree and type of surface sizing or other treatment shall be sufficient to obtain acceptable print quality and ink adhesion as required in sections 3.5.3, 3.5.4.1 and 3.5.4.2.

3.1.3 Recovered Materials. At least 25 percent (by weight) of the fiber used in currency paper should meet the requirements of 40 CFR 250.4, paragraph (kk). Fragments of security threads, other counterfeit deterrent features, or parts thereof, shall not be included in the finished material.

3.2 Security Features. The paper shall contain unique security features exclusive to U.S. currency paper. Types I, II, and III paper shall contain one or more of the following security features: distinctive fibers, security threads, and registered watermark. Type IV paper may contain any of the aforementioned security features plus other features to be determined at a later date.

3.2.1 Distinctive Fibers. Distinctive fibers will be furnished by the Government. The U.S. currency distinctive features are subject to Title 18 United States Code, Section 474 Public Law 772. Types I and II paper shall include red and blue distinctive fibers. Type III paper shall include ACD-type red, blue, and clear distinctive fibers. Type IV currency paper may contain distinctive fibers.

3.2.1.1 Distinctive Fibers for Types I and II. Types I and II paper shall contain red and blue distinctive fibers, randomly distributed throughout the sheet. The contractor shall add 0.454 kilograms (1 pound), plus or minus ten percent of each of the distinctive fibers per 1,453 kilograms (3,200 pounds) of fiber furnish. The distinctive fibers will be furnished by the Government.

3.2.1.2 ACD Distinctive Fibers for Type III. Type III paper shall contain ACD-type red, blue, and clear distinctive fibers, randomly distributed throughout the sheet. The contractor shall add 0.454 kilograms (1 pound), plus or minus ten percent of each of the ACD distinctive fibers per 1,453 kilograms (3,200 pounds) of fiber furnish. The Bureau reserves the option to increase the clear ACD distinctive fiber concentration by 50% (from 0.454 to 0.681 kilograms). The BEP will provide the contractor with information on sources of supply for devices to permit inspection of clear ACD distinctive fibers. Use of a company and/or product name does not imply approval or recommendation of the product in preference to others that may also be suitable. Any Type IV distinctive fibers will be determined by the BEP at a later date.

3.2.2 Security Threads. Each sheet of Types II and III paper shall contain four security threads, which are completely embedded into the paper and run in the machine (short) direction of the sheet in accordance with **Figure 1**. The thread shall be imprinted with the letters "USA" and the denomination of the note. The thread for the Type II paper shall not fluoresce when exposed to any wavelength of ultraviolet radiation. The thread for the Type III paper shall fluoresce with denomination-specific colors when exposed to long wave ultraviolet radiation. **Table II** lists the thread dimensions, graphics height, specific colors, and denomination imprints. Type IV security thread, if any, will have characteristics to be determined by the BEP at a later date.

3.2.2.1 Security Thread Graphics. The graphics and characteristics shall allow the thread to meet the visibility requirements of section 3.2.2.3. Inverted and reversed repeats of the text shall read from the trailing edge to the leading edge of the sheet when the sheet is viewed from either side under illumination from the opposite side of the sheet. **Figure 2** is an example of the thread graphics layout. Smaller graphic heights may be selected for use together with the standard graphic height on Type III denominations other than $100.

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TABLE II Security Thread Details (Type II and III)

Property	Requirement	
	Minimum	**Maximum**
Width, millimeters (inches)	**1.4** (0.055)	**1.8** (0.071)
Thickness, micrometers (inches), Type II: **Thickness**, micrometer (inches), Type III:	**10.0** (0.0004) **10.0** (0.0004)	**30.0** (0.0012) **34.5** (0.00135)
Standard Thread Graphics Height, Millimeters (inches) Note: Smaller graphic heights may be selected for use together with the standard graphic height on Type III denominations other than $100.	**0.96** (0.038)	**1.17** (0.046)
Graphic Imprint Type II $5 Type II $10 Type II $20 Type III $20 Type III $50 Type III $100	 USA FIVE USA TEN USA TWENTY TBD (To be determined) TBD USA 100	
Fluorescent Color Type II $5 Type II $10 Type II $20 Type III $20 Type III $50 Type III $100	 None None None TBD TBD Red	

3.2.2.2 Security Thread Locations and Tolerance. The locations of the center of the threads in a sheet are specified for a sheet oriented such that the felt side of the sheet is up and the machine direction of the sheet is vertical. With the sheet in that orientation, the left edge of the sheet will be designated as the "side guide edge". The upper edge will be the "leading edge" of the sheet and the lower edge will be the "trailing edge". All threads shall be parallel to the "side guide edge" of the sheet. **Table III** shows the locations of the thread centers from the side guard edge of a sheet for Type II and III papers. The thread location for Type III $50 denomination and below, and if required, Type IV paper, will be determined at a later date.

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TABLE III Security Thread Location and Tolerance

	Distance of Thread Center from Sheet Side Guide Edge, millimeters (inches)		
	Type II	**Type III**	
	$5, $10, and $20	**$20 and $50**	**$ 100**
First Thread	**31.0 ± 0.8** (1.22 ± 0.03)	TBD	**40.0 ± 4.0** (1.57 ± 0.16)
Second Thread	**187.4 ± 0.8** (7.38 ± 0.03)	TBD	**196.0 ± 4.0** (7.72 ± 0.16)
Third Thread	**343.4 ± 0.8** (13.52 ± 0.03)	TBD	**352.0 ± 4.0** (13.86 ± 0.16)
Fourth Thread	**499.4 ± 0.8** (19.66 ± 0.03)	TBD	**508.0 ± 4.0** (20.00 ± 0.16)

3.2.2.3 Security Thread Visibility. In reflected light, the security thread shall not be readily visible, nor shall the thread graphics be legible. In transmitted light, with the unaided eye, the graphics should be clearly readable. To the unaided eye, all characters shall appear solid and their background shall appear free from spots. The visibility characteristics are determined at approximately 20 to 50 lux (200 to 500 footcandles) of illuminance.

After the paper has been printed, the thread should be completely embedded in the paper with no more than 1.6 millimeters (1/16 inch) of thread in the longitudinal direction not covered by paper fibers in any finished currency note. The thread in the note should have no folds, twists, or breaks. For a finished note, any distortion or missing portion of the graphics will be unacceptable if more than one standard height phrase in either direction is not legible by transmitted light. Requirements for missing graphics on graphics of less than standard height (Type III paper for notes other than $100, and if required, Type IV paper) will be determined at a later date.

3.2.2.4 Security Thread Splices. Thread splices should be avoided. A splice should not obscure more than one phrase in either direction for any finished currency note or cause a localized increase in paper thickness.

3.2.2.5 Security Thread Thickness. The thread thickness should not prevent stacks of 10,000 sheets from feeding the intaglio presses at speeds up to 10,000 sheets per hour. The required minimum and maximum thickness for Type II and Type III paper are shown on Table II.

3.2.2.6 Security Thread Bonding. Each thread shall bind to the paper fibers such that an intact thread cannot be pulled out from the note before the thread has stretched to at least 13 times its original length in accordance with the testing procedure given in section 4.2.4.15.

3.2.2.7 Chemical Resistance of Security Thread. The security thread on all paper types containing security thread, the thread fluorescence (Type III and, if required, Type IV paper), and the thread graphics in printed notes shall not degrade in appearance or visibility as specified in section 3.2.2.3 due to attack by the chemicals listed below in **Table IV** when evaluated as specified in section 4.2.4.16.

TABLE IV Security Thread Chemical Resistance

Chemical	Concentration
Sulfuric Acid, H_2SO_4	1% reagent grade by volume, aqueous
Sodium Hydroxide, NaOH	2% by weight, aqueous
Sodium Hypochlorite, NaOCl	5.25% household bleach, diluted 1:4 with distilled water
Ethanol, C_2H_5OH	Denatured ethyl alcohol, 190 proof
Perchloroethylene, C_2Cl_4	Undiluted reagent grade
Toluene, $C_6H_5CH_3$	Undiluted Certified ACS grade
Acetone, C_3H_6O	Undiluted Certified ACS grade
Gasoline, unleaded	Undiluted
Sodium Chloride, NaCl	10% by weight, aqueous
Mineral Spirits	Undiluted (at 760 mm Hg: IBP = 310° F, 50% = 326-334°F, EP = 366° F, K.B. Value: 29-35)

3.2.2.8 Resistance to Laundering of Security Thread. The thread, thread fluorescence (Type III and, if required, Type IV paper), and thread graphics on the printed note shall not degrade in appearance or visibility after the printed notes have been laundered in accordance with section 4.2.4.18.

3.2.3 Watermark. Each sheet of Type III paper will contain 32 watermarks of a denomination-specific portrait design arranged in four columns of eight watermarks in each column. The size and location of the $100 denomination watermark should correspond to **Figure 3** of this specification. The size and locations of other denomination watermarks will be determined at a later date.

Any device containing the image of the watermark portrait designated as a feature of U.S. currency shall be the property of the United States Government and subject to Title 18 United States Code, Section 474 of Public Law 772, 80th Congress.

The quality of the watermark should be equal to or better than the reference sheet established by the BEP. The inspection for watermark quality will be made by visual observation of the clarity and measurement of the size and location of the watermark. The contractor and BEP will work together to establish standards for the quality of the watermark. The process of establishing the standard should be addressed in the contractor's quality assurance program.

3.2.4 Type IV Features. Features for Type IV currency paper should be resistant to counterfeiting, durable, recognizable, and useable by the general public. Features should be proven, not a prototype, and ready for manufacture without additional development although finalization of BEP-specific details of the features may be performed after contract award. The Type IV features in production materials received by the BEP after contract award shall be of the quality of and have properties equal to the samples accepted by the BEP. The Type IV features shall be suitable for use in BEP printing and processing with existing equipment and inks without destruction or damage to the feature.

Type IV paper and the security features it contains shall not degrade in appearance or visibility when evaluated as specified in sections 4.2.4.16 and 4.2.4.18

3.2.4.1 Samples of Type IV Paper Layouts. The contractor shall provide trial (evaluation) samples of Type IV sheet layout. The final sheet layout will be determined by the contractor and BEP at a later date.

3.3 Notch. A semi-circular or V-shaped notch shall be made in a denomination-specific location on the trailing edge of Type II, III, and IV currency paper sheets. Notches that are V-shaped notches shall have a rounded inside corner. The notch shall assist in identifying the trailing edge and the denomination of the paper. The notch shall be 13 to 17 millimeters (0.5 to 0.7 inches) wide when measured along the edge of the sheet. The notch shall be 3 to 4 millimeters (0.1 to 0.2 inches) deep into the sheet when measured on a line perpendicular to the edge of the sheet. Currently established notch location and tolerance are given in **Table V**. The notch location for Type IV paper will be determined at a later date.

3.4 Modification of Paper Security Features. The BEP reserves the right to request changes to any agreed upon paper feature. Such requests shall be limited to modifications which the supplier can make with its existing technical capabilities. Contractors agree that the Bureau may request such changes and that the supplier will inform the Bureau in writing whether the changes are feasible with existing technology.

TABLE V Notch Location and Tolerance (Types II and III Paper)

Denomination	**Distance Of Notch Center From Side Guide Edge,** millimeters	**Tolerance**, millimeters
$ 5	150	± 5
$ 10	280	± 5
$ 20	400	± 5
$ 50	450	± 5
$ 100	525	± 5

3.5 Performance Requirements.

3.5.1 Printing. The paper shall be acceptable for use with the BEP's intaglio and typographic inks. During printing, the paper shall not tear, delaminate, or lint on the surface. The paper will be printed on the BEP's I-8 and I-10 presses at speeds up to 10,000 sheets per hour. The intaglio printing units have a printing pressure that may be as high as 6,000 pounds per linear inch. The printing cylinder temperatures may be as high as 90ºC (194º F) and impression cylinder temperatures may be as high as 49ºC (120ºF). The delivery train is approximately 40 feet; the printed sheets are stacked 10,000 sheets high.

3.5.2 Processing. The paper should not delay the processing of the printed notes beyond 72 hours after printing by retarding the curing of the intaglio ink. The printed paper shall be suitable for examination, typographic over-printing, cutting, and packaging by the BEP's automated Currency Over-Printing, Examination, and Packaging (COPE-PAK) equipment. The processed work is stacked, cut into individual notes, and immediately packaged in shrink-wrap film.

3.5.3 Print Quality. The intaglio engraved images, typographic seals, and serial numbers should print on the paper with quality equal to or exceeding BEP print quality reference sheets.

3.5.4 Requirements for Printed Work. Printed sheets should be immediately stackable up to 10,000 sheets, without excessive set-off or blocking. Set-off is considered excessive when the ink transfers to the adjacent sheet to such an extent that it is noticeable during the examining process and is deemed to be unacceptable. Blocking is considered excessive when more force than normal is required to separate the printed sheets. The paper, including the embedded security features, shall not cause abnormal damage or wear to the intaglio plates or sleeves, inking rollers, press impression cylinder or rigging materials, or knives used during the processing of printed work.

The degree of curling, wrinkling, waviness, uneven stacking due to thickness variation, or other conditions that affect the runnability of the paper should not adversely affect the printing or processing of the currency notes.

3.5.4.1 Ink Adhesion ("Crumple Test"). Currency ink loss from notes printed on the paper shall not exceed acceptable levels. The acceptable level of ink loss is a crumple test rating of 4.0 to 6.0 for the lot average. See section 4.2.4.17.

3.5.4.2 Ink Loss and Color Change in Laundering. Currency ink loss caused by laundering shall not exceed acceptable levels. Notes printed on the paper shall not change color to a greater extent than notes rated acceptable on the BEP standard laundering scale. The acceptable level of ink loss or color change is a laundering test rating of 4.0 to 6.0 for the lot average. Counterfeit deterrence features of Type IV paper shall not suffer damage beyond acceptable levels when subjected to the laundering test. See section 4.2.4.18.

3.5.4.3 Currency Verification Machine. The printed notes shall process acceptably through the currency verification equipment used by the Federal Reserve including the Currency Verification, Counting, and Sorting (CVCS) machine and the ISS 3000.

3.6 Paper Physical Requirements. Type I, II, and III paper shall conform to the requirements listed in **Table VI**. Type IV paper should conform to the requirements listed in **Table VI** except the properties listed in **Table VII**. The grammage and caliper of Type IV paper shall be within the range specified in Table VII; however, the grammage and caliper of production grade Type IV paper shall exhibit a more limited tolerance range. The tolerance range should be included in the contractor's quality assurance program.

3.6.1 Folding Endurance. The paper shall exhibit the required folding endurance values on the blank paper, and alongside the security thread of Type II, III, and, if required, Type IV paper. The folding endurance at the probable centerline of the note should not be weakened by the placement of a security feature on that area.

3.6.2 Color and Lightfastness. The color of both wire side and felt side should be within the limits indicated in **Table VI**. The color and control limits shall be expressed in L*a*b* coordinates of the CIE 1976 Uniform Color Space. In addition, the currency paper shall be lightfast when exposed to 20 hours of xenon arc light exposure in accordance with section 4.2.4.11. The paper should have a ΔE of 2.0 or less.

3.6.3 Chemical Resistance. The paper shall be resistant to the action of the chemicals listed in **Table IV** when subjected to the procedure specified in section 4.2.4.16.

3.6.4 Fluorescence. Fluorescent dyes, pigments, or optical brighteners shall not be added to the furnish used in making the paper. Fluorescence due to contamination from broke added during paper manufacture of Type III paper should be below that of a reference sheet agreed upon by BEP and the contractor. Counterfeit deterrence features of Type IV paper shall not fluoresce unless such fluorescence is an integral part of the feature as accepted by the BEP.

The increase in reflectance shall not exceed one (1) percent when fluorescence is measured on the blank paper (not in the security thread area), with and without the ultraviolet component of a light source with a color temperature of approximately 3000º Kelvin. See section 4.2.4.9.

3.6.5 Formation. The paper should be structurally uniform exhibiting even fiber distribution and regular formation without a mottled appearance on look-through when compared to a BEP-approved reference sheet.

TABLE VI Paper Physical Requirements
(Type I, II, and III Paper)

Physical Property	Minimum	Maximum
Grammage, Blank Paper, Grams per square meter (Pound/500 sheets, 17 by 22 inches)	**84.2** (22.4)	**93.1** (24.7)
Sheet Size Length,Centimeter (inches) Width, Centimeter (inches)	 **56.06** (22.07) **63.02** (24.81)	 **56.87** (22.39) **63.20** (24.88)
Caliper, Blank Paper, Micrometer (inches)	**117** (0.0046)	**132** (0.0052)
Opacity, Blank Paper, Percent (89% reflectance backing)	**92**	*
Tearing Resistance, grams Machine Direction, Blank Paper Machine Direction at Security Thread or Localized Type III security feature	 **84** **75**	 – –
Tensile Strength (wet), kiloNewton/meter Cross Direction, Blank Paper	 **1.3**	 –
Fluorescence, Blank Paper, Percent	–	**1.0**[a]
Folding Endurance, Blank Paper, Schopper (Average), Log base 10 Cross Direction Cross Direction at Security Thread or Localized Type III security feature	 **3.6** **3.0**	
Thread Bonding, Percent Elongation, Types II and III	**130**	–
Color, CIE L*a*b* Uniform Color Space, L* a* b*	**86.06** **-0.30** **11.97**	**87.86** **-1.20** **13.97**
Ash, Percent	–	**TBD**
pH, (hot water extraction), Blank Paper	**5**	–

[a] The maximum Fluorescence of 1.0 may be re-determined at a later date.

* Maximum opacity should be such that the requirements for security thread visibility are met. See section 3.2.2.3.

TABLE VII **Paper Physical Requirements**
(Type IV Paper Only)

Physical Property	Minimum	Maximum
Grammage, Blank Paper, Grams per square meter (Pound/500 sheets, 17 by 22 inches)	**75** (20)	**102** (27)
Caliper, Blank Paper, Micrometer (inches)	**114** (0.0045)	**132** (0.0052)

3.6.6 Moisture Content and Environmental Conditioning. The moisture content of the paper shall be such that after a wrapped load has been allowed to stand at room temperature of 23 ± 2° C (73 ± 3.5° F) for 24 hours, the equilibrium Relative Humidity of the paper immediately after being unwrapped is 45 ± 5% when measured in accordance with TAPPI method T-502.

3.6.7 Frequency of Occurrence of Sheet Defects.

a) Types II and III paper should contain no more than 1 occurrence in 100,000 sheets of each of the following defects: non-embedded or partially embedded threads (surface threads); missing graphics; missing threads; or threads of the wrong denomination.

b) The paper should contain no more than 1 occurrence per 50,000 sheets of any of the following defects: improper thread location; misprinted, distorted, or misregistered thread graphics; wrinkles; tears; scraps or trimmings; incompressible matter; or any lumps more than twice the thickness of the paper.

c) The paper should contain no more than 1 occurrence per 10,000 sheets of each of the following defects: presence of security thread fragments; missing or incorrect notch; holes; or defects in Type IV counterfeit deterrence feature.

d) The paper should contain no more than 3 occurrence per 10,000 sheets of the following defects: discolored areas or dark compressible foreign matter greater than 1 millimeter in diameter and greater (darker) than 30% dense (screen) as viewed from a reflected light inspection system. See definitions in section 6.

The requirements on the defect occurrence frequency may be revised based on results of future joint capability studies of the contractor's operating processes.

3.6.8 Trim. Sheets of currency paper shall be trimmed square on four sides, with clean linear edges. A corner will be considered square if the edges of the sheet forming that corner, measured at the points on the edges most distant from the corner, are no more than 1.3 millimeters (0.05 inch) from the position that the edges would occupy if the corner had an angle of exactly 90.0°.

3.7 Requirements for Safety and Health during Handling, Printing, and Processing.

3.7.1 Material Safety Data Sheets (MSDS). The contractor shall have on file in the BEP an approved MSDS for each type of paper. The MSDS shall comply with the Occupational Safety and Health Administration (OSHA) requirements as listed in 29 CFR 1910, Part 1200, paragraphs (g) and (i).

3.7.2 OSHA Emission Requirements. The paper shall not emit hazardous substances during any of the following manufacturing phases: storage prior to use; printing; processing; or storage of printed sheets. The OSHA Hazard Communication Standard (29 CFR 1910.1200) and its appendices define health hazards and list information sources to be used in establishing which substances are at or above concentration levels that are hazardous.

3.7.3 Safety and Health. The BEP retains the right to reject any currency paper which causes an adverse effect upon its employees. Adverse effects include, but are not limited to: headache; eye, dermal, nasal, or throat irritation; sensitization, nausea, and dizziness.

3.8 Environmental Requirements.

3.8.1 Premanufacture Notification. The contractor shall comply with regulations set forth in 40 CFR Part 720, Premanufacture Notification. This document establishes premanufacture notification requirements under Section 5 of the Toxic Substances Control Act (TSCA).

3.8.2 Proposition 65. The currency paper shall not contain any of the chemicals listed by California's "Safe Drinking Water and Toxic Enforcement Act of 1986" (Proposition 65).

3.9 Other Requirements.

3.9.1 Property Rights. The paper including counterfeit deterrent features shall be the property of the United States Government and subject to Title 18 United States Code, Section 474 of Public Law 772, 80th Congress.

4. Quality Assurance Provisions.

4.1 Contractor Quality Assurance Program. The contractor shall have a BEP-approved quality assurance program that they shall use to ensure that the currency paper meets the requirements of the BEP. The quality assurance program shall address the requirements of the American National Standard Institute/American Society for Quality Control (ANSI/ASQC) standard: Quality Systems - Model for Quality Assurance in Production, Installation, and Servicing, ANSI/ASQC 9002-1994. The BEP accepts the counterpart in the International Standards Organization, ISO 9002, as technically equivalent to Q9002-1994.

4.1.1 Modification of the Quality Assurance Program. During the term of the contract, contractors shall adhere to the approved quality assurance program. Administrative and corrective revisions on the program are allowed without prior BEP approval but should be brought to the attention of the BEP. The contractor may propose changes to the quality assurance program during the life of the contract. Proposed changes shall be submitted to the Contracting Officer, with written justification for such changes.

4.1.2 Sheet Count Verification System. The quality assurance program shall include a system for verifying, by actual recount, the exact number of sheets in packaged distinctive currency paper loads. The frequency of recount and the number of loads recounted will be determined by the contractor, but shall not be less than two times a month and less than five loads at each time. The contractor shall submit a "Certification of Actual Sheet Count" which contains the actual sheet count of verified (recounted) loads, and dates the sheet count was verified. The certification shall be signed by the contractor's quality assurance manager and submitted to the Contracting Officer's Technical Representative (COTR) on the last day of each month.

4.2 Responsibility for Inspection and Testing. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection and testing requirements as specified herein. As a minimum, the contractor shall use inspection equipment capable of 100 percent inspection for all defects and variables stated in section 3.6.7. The inspection equipment should remove and/or mark for removal by the contractor all non-conforming sheets. Except as otherwise specified, the contractor may utilize his own facilities or any commercial laboratory acceptable to the BEP. The BEP reserves the right to perform any inspection or test set forth in this specification. This will include periodic quality audits and monitoring of production at the facilities of the contractor(s).

4.2.1 BEP Testing. The BEP will evaluate the currency paper, on BEP equipment, for compliance with the requirements of the following sections:

- 3.2 Security Features
- 3.5 Performance Requirements
- 3.5.4.1 Ink Adhesion
- 3.5.4.2 Ink Loss and Color Change in Laundering
- 3.5.4.3 Machine Verification
- 3.6.3 Chemical Resistance

4.2.2 Sampling. The contractor shall provide sample sheets that represent production loads based on TAPPI method T-400 appendices A, B, and C. The sampling plan shall be approved by the COTR. Sample sheets shall be furnished at the time of delivery of the paper. Samples shall be identified with the appropriate BEP stock number, the lot number, the load number, and date of manufacture. The container of the samples shall be sealed and labelled with the BEP currency paper sample stock item number, load number, purchase order number, and the number of sheets in the container.

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P: DST-3a,
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4.2.3 Inspection. The following inspections shall be conducted in accordance with the methods given in **Table VIII** which follows:

TABLE VIII Inspection Requirements

Characteristics	Inspection
Table VI Sheet Size	Measurement in centimeters
3.2.1.1, 3.2.1.2 Distinctive Fibers	Visual evaluation; evaluation of ACD characteristics of fibers
3.2.2.2 Thread Location, Types II and III Paper; Type IV Feature Location	Measurement; comparison against reference template
3.2.2 Thread Characteristics, Types II and III Paper	Visual evaluation; machine inspection of sheets; width and thickness measurement of thread; examination with long wave (365 nm) ultraviolet
3.2.2.1 Thread Graphics, Types II and III Paper	Visual evaluation; machine inspection of characters, spaces, layout orientation and text; verification of denomination; measurement of layout and character dimension; legibility
3.2.3, 3.2.4 Watermark Quality and Location, Type III Paper; Type IV Feature Quality	Visual evaluation; comparison against reference template
3.3 Notch, Types II, III and IV Paper	Visual inspection; measurement of position, width, and depth
3.6.5 Paper Formation	Visual evaluation
3.6.7 Paper Defects	Visual evaluation; measurement, and counting
3.6.8 Trim	Visual evaluation; measurement of squareness
Section 5 Preparation for Delivery	Visual evaluation; measurements and comparison of label versus actual denomination of load

4.2.4 Testing. Tests shall be conducted in accordance with the following methods listed in **Table IX**. Reference to specific instruments is for information only; use of a company and/or product name in this document does not imply approval or recommendation of the product in preference to others that may also be suitable. The BEP will work with contractors to establish correlations between various instruments.

Group A tests shall be performed on areas of the paper (blank paper) free from security thread, watermark, or localized Type IV feature. Group B tests shall be performed on the blank paper, the security thread area, and on the watermark area. Group C tests shall be performed at the BEP on the entire printed note, on the security thread area only, or on localized Type IV feature area only.

TABLE IX Test Method Groups

	TEST METHOD	RESULT TO BE INCLUDED IN THE CONTRACTOR'S CERTIFICATE OF CONFORMANCE
Group A:		
Fiber Content	Certification	YES - monthly
Machine Direction	T-409	NO
Grammage	T-410	YES - every delivery
Opacity	T-425	YES - every delivery
Fluorescence	T-452	YES - every delivery
Color	see 4.2.4.12	YES - every delivery
Ash Content	T-211	YES - monthly
pH	T-435	YES - every delivery
Group B:		
Caliper	T-411	YES - every delivery
Tearing Resistance	T-414	YES - every delivery
Tensile Strength (wet)	T-456	YES - every delivery
Lightfastness	see 4.2.4.11	YES - monthly
Folding Endurance	T-423	YES - every delivery
Thread Bonding	STM 300.004	YES - every delivery
Group C: (To be performed by the BEP)		
Ink Adhesion	STM 300.001	Not Applicable
Chemical Resistance	STM 300.003	Not Applicable
Laundering	STM 300.002	Not Applicable

4.2.4.1 Test Conditions. Paper samples will be preconditioned, when necessary, and conditioned prior to testing. Testing will be performed in an environmentally controlled room at 50.0% ± 2.0% relative humidity (RH) and 23.0 ± 1.0° C (73.4 ± 1.8° F) temperature in accordance with TAPPI method T-402.

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P: DST-3a,
April 19, 1995
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4.2.4.2 Material Composition. The fiber composition of the paper shall be determined according to TAPPI method T-401. Results of this analysis shall be reported once a month.

4.2.4.3 Machine Direction. The machine direction of Type I paper shall be determined according to TAPPI method T-409.

4.2.4.4 Grammage. The grammage of the paper shall be determined according to TAPPI method T-410.

4.2.4.5 Caliper. The caliper of the paper shall be determined according to TAPPI method T-411 on areas free from security thread or watermark and on areas containing security thread, watermark or localized Type IV feature. Measurement of caliper on areas containing security thread, watermark or localized Type IV feature shall be taken with the pressure foot centered over the thread, watermark, or localized Type IV feature.

4.2.4.6 Opacity. The opacity of the paper shall be determined according to TAPPI method T-425, using an 89% reflectance backing.

4.2.4.7 Tearing Resistance. The tearing resistance of the paper shall be determined according to TAPPI method T-414. In the testing of specimens containing security threads, the machine direction tear shall be conducted on specimens cut and clamped in the tester so that the tear occurs immediately adjacent to the thread. The initial slit shall contact the edge of the thread. Eight (8) plies shall be stacked so that the threads are superimposed. If tearing resistance in areas bearing a watermark (Type III paper) will be determined, the plies shall be stacked so that the watermarks are superimposed. An alternate method will be to determine tear resistance of watermark and along the security thread on a single-ply sample using a pendulum of suitable mass to give a mid-scale reading.

4.2.4.8 Wet Tensile Strength. Test strips cut with their length dimension in the cross direction shall be immersed in distilled water for five minutes and then lightly blotted before being testing in accordance with TAPPI Method T-456. Test strips shall be cut 15 millimeters wide rather than 25.4 millimeters wide. When cross direction wet tensile strength is determined on specimens containing the security threads, specimens shall be cut and tested so that the thread is centered between the clamps during testing. The reported value will be the average of areas with and without the security thread for Type II and III papers.

4.2.4.9 Fluorescence. The fluorescence of the paper shall be determined in accordance with TAPPI method T-452.

4.2.4.10 Folding Endurance. The folding endurance of the paper shall be determined according to TAPPI method T-423. In testing specimens for cross direction folding, Type II and III paper containing security threads shall be cut and positioned so that the thread is centered vertically in the vertical slot of the reciprocating blade.

4.2.4.11 Lightfastness. The test for fading shall be conducted using a xenon-arc light exposure apparatus (e.g., a Fadeometer from Atlas Electric or the equivalent) as follows. Measure the color of the test samples instrumentally according to ASTM Method D 2244. Record the color as CIE 1976 L*a*b* uniform color space values. Cut samples of suitable size to fit in the sample holders of the light exposure apparatus. Mask a portion of the sample from the arc light. Place the samples in the positions provided within the exposure apparatus and expose to the arc for a total of twenty hours as specified in ASTM Method G 26, Test Method C with black panel temperature at 63$\pm$3° C (145$\pm$5° F) and relative humidity at 30$\pm$5%. Measure the color of the samples once more. ΔE should not exceed 2.0. When testing for fading in the security thread area of Type II and III paper or any localized Type IV feature, measure the color on an area that includes the security thread or localized feature.

4.2.4.12 Color. The color of test specimens shall be determined in accordance with ASTM method D 2244, and expressed as CIE 1976 L*a*b* Uniform Color Space values. Reflectance data shall be taken using illuminant D65 (D-6500K), with specular reflection excluded. Measurements shall be taken on specimens backed by a stack of the same sample, thick enough so that doubling the thickness does not change the reflectance readings. Reflectance shall be measured at six points on each sample, three on each surface of the sheet. The average for each side shall be reported.

The BEP measures color using an instrument having a 6-inch, 8° integrating sphere, illuminant D65, a standard 10° observer, specular reflectance excluded, and an aperture of 22 mm (0.875 inch) diameter. The BEP will provide reference color samples and color data on those samples for use by the contractor, and will assist the contractor in establishing a correlation between the BEP and the contractor's color measurement systems.

4.2.4.13 Hydrogen Ion Concentration (pH). The pH of the paper shall be determined according to TAPPI method T-435.

4.2.4.14 Ash Content. The ash content of the paper shall be determined according to TAPPI method T-211.

4.2.4.15 Thread Bonding Strength. The bonding strength test will be performed in accordance with STM 330.004.

4.2.4.16 Chemical Resistance. Testing shall be completed in accordance with STM 300.003. Only the 24 hour soak tests will be performed.

4.2.4.17 Ink Adhesion ("Crumple Test"). The ink adhesion test will be performed by the BEP on notes printed on the sample paper in accordance with BEP STM 300.001. Ink loss from the sample paper will be compared visually to the BEP reference crumple scale. The scale consist of specimens assigned numerical values from 0 through 6, with 0 denoting the worst ink adhesion and 6 denoting the best ink adhesion at the specified number of crumples.

4.2.4.18 Resistance to Ink Loss in Laundering. The laundering test will be performed by the BEP on notes printed on the sample paper in accordance with STM 300.002. The extent of ink loss and color changes in the ink film or the sample paper will be compared visually to BEP reference laundering scales. These scales consist of specimens assigned numerical values from 0 through 6, with 0 denoting the greatest ink loss or change in color and 6 denoting the least ink loss or change in color.

4.3 Contractor Documentation. The contractor shall provide the following documentation on the currency paper supplied.

4.3.1 Certification. The contractor shall certify that all materials supplied under this specification meet the requirements set forth in this specification. The certification shall include a statement on the exact number of sheets and the recovered material content. Signed certification for loads of paper delivered to the BEP shall accompany the reports of inspection and tests, and shall be received with or before shipment.

4.3.2 Test Report. The contractor shall furnish to the BEP's Contracting Officer's Technical Representative copies of reports showing the results of tests for each delivery. The reports shall also include the number of loads in each delivery and the load numbers.

The report showing the results of tests should be provided on a floppy diskette and hard copy. The data shall be in a commercially available spreadsheet or database format that is compatible with the Microsoft Disk Operating System (MS-DOS). This statement is made for information only. Use of a company or product name in this specification does not imply approval or recommendation of the product in preference to others that may also be suitable.

5. PREPARATION FOR DELIVERY

5.1 Packaging and Packing. The packaging shall comply with any applicable Department of Transportation Rules and Regulations and shall comply with the applicable requirements of the National Motor Freight Classification Rules and Container Specifications.

5.1.1 Packing. The distinctive currency paper shall be delivered as stacks of 10,000 sheets on skids. Each skidload shall be stacked felt side up and wrapped in kraft wrapping paper. The unit for shipping, called a load, shall consist of two stacks (20,000 sheets total) overwrapped as a unit in water-proof material. Each load shall be sealed on the bottom with water-proof material, capped with heavy corrugated board, and double banded in each direction. The finished unit for shipping is shown in BEP drawing MC-5102-B1, Revision 2.

5.1.2 Skids. The skids for the Washington D.C. facility may be corrugated fiberboard or wooden skids. Fiberboard skids shall be water resistant and not collapse, sag, or conduct water by capillary action to the currency paper if the skid is exposed to accidental shallow flooding of the storage areas. The gross weight for any shipping unit for Washington should be between 636 and 682 kilograms (1400 and 1500 pounds). The skids for the Fort Worth facility shall be wooden skids which conform to the dimensions given in BEP drawing MC-5102-B1 Revision

2. The skids for Fort Worth shall have water-proof material and corrugated cardboard attached to the skid to protect the edges of the bottom ream stacked on it. The unit of shipping shall be similar in other aspects to that for Washington except that the gross weight should not exceed 682 kilograms (1500 pounds).

5.1.3 Alternate Methods. The contractor may request authorization for alternate methods of packaging from the Contracting Officer, prior to the shipment of any paper.

5.2 Marking.

5.2.1 Stack Marking. Each stack of sheets shall be marked on the side opposite from the side guide edge with a color-coded solid bar 4 to 5 centimeters (1.6 to 2.0 inches) in width, running the entire height of the stack. The color code bar shall be positioned adjacent to the corner formed by the edge of the sheet. The marking fluid shall not penetrate into any sheet beyond a depth of 1.6 millimeters (1/16 inch). The denomination color codes are listed in **Table X**. The color codes for Type IV paper and for Type III paper other than $100 denomination, will be determined at a later date.

5.2.2 Inner Wrapper Marking. Each skidload shall bear labels on two sides of the inner wrapping. These labels shall be affixed to the side of the stack formed by the trailing edges of the sheets. The labels shall be color coded as specified in **Table X**. The labels shall indicate the denomination numerically and in written form, for example: "100 - HUNDREDS", and the skidload number. The label dimensions shall be a minimum of 15 centimeters by 15 centimeters (5.9 by 5.9 inches). The color code for markings on some Type III and all Type IV denominations will be determined at a later date.

TABLE X Markings

Denomination	Color Code	BEP Stock Item Number
Type I Paper	Pink	1D000039
Type II Paper		
$ 5	Red	1D390005
$ 10	Black	1D390010
$ 20	Purple	1D390020
Type III Paper		
$ 20	TBD (To Be Determined)	1D39A020
$ 50	TBD	1D39A050
$ 100	Green	1D39A100
Type IV Paper		
$ 1	TBD	TBD
$ 2	TBD	TBD
$ 5	TBD	TBD
$ 10	TBD	TBD

5.2.3 Currency Paper Outer Wrapper Marking. Barcode labels meeting the BEP Specification for Vendor Affixed Barcode Labels For Bureau of Engraving and Printing Materials shall be affixed on two opposite sides of the outer wrapper of the 20,000 sheet load. Each label shall express the same required information in both human-readable and barcoded form. The information shall be in the specific order listed in **Table XI**. The information on the outer wrapper, inner wrapper, and delivery order, e. g., the purchase order number, shall be consistent.

5.2.3.1 Load Numbering. All loads shall be numbered in sequence according to the terms of the contract.

5.2.3.2 Size and Color of Markings. The markings used shall be legible, not less than 25 millimeters high, and dark enough to contrast with the color of the label background.

TABLE XI Human Readable Information for Barcode Labels

"DISTINCTIVE PAPER, BUREAU OF ENGRAVING AND PRINTING SECURITY STOREROOM"	
Purchase Order Number (PO#)	BEP purchase order number
Part Number	BEP stock item number
Quantity	Number of sheets in the shipping unit
Serial/Lot Number	Identification number of the shipping unit (skidload number)
Weight	Gross weight of the shipping unit

6.0 Notes.

6.1 All paper procured under this specification is subject to the provisions of Title 18, United States Code, Section 474 of Public Law 772, 80th Congress, which make unauthorized possession or control of this paper or similar paper a penal offense.

6.1.1 The security features of Type III paper other than $100 have not been established as of the date of this specification and may not be identical to those of the Type III paper for the $100 denomination.

6.2 Definitions. Certain words and phrases are frequently used in a specification. The following rules will apply:

6.2.1 "Shall", the emphatic form of the verb, is used whenever a requirement is intended to express a provision that is binding.

6.2.2 "Will" is intended to express a declaration of purpose on the part of the Government. It may also be used to indicate simple futurity.

6.2.3 "Should" is used whenever a non-mandatory characteristic is judged to be desirable for the material of product. As such, this characteristic may be graded during the evaluation of the material in order to assist in the selection of the best qualified material.

6.3 Technical Definitions. The following definitions from the *Dictionary of Paper*, 5th Edition, Technical Association of the Pulp and Paper Industry, Technology Park, Atlanta, P.O. Box 105113, Atlanta, GA 30348-5113.

6.3.1 Broke. Paper that has been discarded anywhere in the process of manufacture. It is usually returned to a repulping unit for reprocessing.

6.3.2 Close Formation. The formation of a sheet that is uniform and free from a wild (q.v.) or porous appearance when viewed by transmitted light.

6.3.3 Foreign Particles. Particles other than fiber, embedded in the pulp, appearing opaque when viewed by transmitted light, and having an area not less than $0.02mm^2$.

6.3.4 Furnish. The mixture of fibrous and nonfibrous materials such as fillers, sizing, and colorants in a water suspension from which paper or paperboard is manufactured.

6.3.5 Hole. An opening in a paper sheet, caused by slime, stock lump, coating splash, or other causes.

6.3.6 Lump. A localized thickened area in paper caused by an agglomeration of fiber or other materials.

6.3.7 Wrinkle. A creaselike defect in paper produced during manufacturing or converting operations.

6.4 BEP-specific Definitions. The following definitions have been developed at the BEP.

6.4.1 Compressible Matter. Matter that deforms or reduces in volume in such a manner that it does not cause damage (or create the potential to cause damage) to the printing plate or impression cylinder when passing through the closed printing nip.

6.4.2 Incompressible Matter. Matter that does not deform or reduce in volume and thus causes (or creates the potential to cause) damage to the printing plate orimpression cylinder when passing through the closed printing nip.

6.4.3 Load. Two 10,000 sheet stacks of currency paper.

6.4.4 Distinctive Fiber. Red or blue fibers provided by the U.S. Government which are added during the manufacture of U.S. currency paper. The presence of these fibers in Federal Reserve Notes prove authenticity of the note.

6.4.5 ACD Distinctive Fiber - A type of distinctive fiber present in Type III $100 currency paper. ACD stands for "advanced counterfeit deterrence". These fibers are furnished by the U.S. Government.

6.4.6 Security Feature. Characteristics or devices contained in currency paper to provide authenticity or counterfeit deterrence property to U.S. currency.

6.4.7 30% Screen. The limit of acceptability by the BEP on-line inspection system. The resolution of the screen is 0.004 inch dot size or 250 dots per inch.

ATTACHMENTS:

Figure 1: Security Thread Location for Types II and III Currency Papers.
Figure 2: Security Thread Details.
Figure 3: Watermark Location.
Drawing: MC-5102-B1

[end]